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United States
Department of
Agriculture

United States
Department of
Health and
Human Services

December 2, 1982

Design and Evaluation of Nutrition Label Formats

center under nutrition? not as sure

Information Kit

ORIGINAL
COMPLETED

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I. Introduction

In 1979 the FDA and USDA's Food Safety and Inspection Service, along with FTC, concluded that the current nutrition labeling system, a good first step, needed revision to make it more understandable and useful to consumers. To achieve this goal, the agencies reviewed current regulations and solicited the views of the public on various food labeling issues by holding a series of public hearings and by asking for written comments. To supplement this information, FDA conducted a survey of food shoppers to find out their views on certain aspects of food labeling. FDA conducted a second survey with nutritionists, the food industry and consumers on nutrition labeling.

Additionally, the agencies established an interagency task group to work with industry and consumers to develop proper experimental format designs and the appropriate criteria for evaluating these experiments. The objective of the groups was to focus on "how" to communicate nutrition information rather than "what" information should be on the food label.

To this end, the FDA's Bureau of Foods engaged the services of Robert P. Gersin Associates (RPGA), a New York design firm, to design alternative labeling formats to be subjected to consumer testing. The material to follow presents the final nutrition labeling formats designed and recommended by RPGA.

This information will be distributed to the attendees at a public meeting to be held in Washington, D.C. on December 2, 1982 and to others on request. A plan to evaluate the formats will also be distributed. Written comments on the formats and evaluation research plan should be submitted by January 31, 1983 to:

Raymond C. Stokes
Division of Consumer Studies (HFF-240)
Bureau of Foods
Food and Drug Administration
200 C St. S.W.
Washington, D.C. 20204

Requests for either the Information Kit or Evaluation plan should be made to either the individual stated above or to:

Wayne A. Batwin
Policy and Program Planning
Food Safety and Inspection Service
U.S. Department of Agriculture
Washington, D.C. 20250

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II. Background

A. Chronology of the Current Food Labeling Review Program

1969 White House Conference on Food, Nutrition and Health
1972 FDA'S preliminary proposal on nutrition labeling
1973 FDA's final nutrition labeling regulation
1975 FDA's effective nutrition labeling compliance date
1978 Five city hearings on food labeling conducted by FDA, USDA, FTC
1978 FDA's consumer survey on food labeling
1979 Tentative position on food labeling announced in Federal Register
1980 Robert P. Gersin Associates awarded contract to design label formats
1980 Hearing of food labeling held in Washington, D.C.
1980 FDA's survey on nutrition labeling conducted with American Institute of Nutrition, food industry, consumers
1980 First public meeting on food labeling

B. Goal of the Nutrition Labeling Design Project

The goal of the project is to design an array of communication-effective nutrition labeling formats for consumer testing.*

C. Nutrition Labeling Design Criteria

Develop formats which:

1. Are simple, clear and easily understood
2. Are technically accurate
3. Minimize cost
4. Invite use by consumers
5. Could be applied to all packaged food products
6. Meet packaging space requirements
7. Are adaptable to future needs

* Originally the goal included the design of ingredient lists formats and summary statements or symbols as well as nutrition label formats. Subsequently, the project was refocused to concentrate solely on nutrition label formats.

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III. Design Output for Nutrition Labeling Formats

A. Analysis and design development of the nutrition label formats was based on a cheese pizza label as representative of packaged food products on the market today.

Cheese pizza

Nutrition Information Per Serving	
Serving Size	¼ Pizza
Servings per Container	4
Calories	240
Protein	9g
Carbohydrate	35g
Fat	7g
Percentage of U.S. Recommended Daily Allowances (U.S. RDA)	
Protein	20%
Vitamin A	15%
Vitamin C	8%
Riboflavin	10%
Thiamine	8%
Niacin	10%
Calcium	10%
Iron	6%

B. Upon analysis of the present label format, the following observations were made by RPGA and FDA (these observations have been corroborated by surveys and test studies conducted by the FDA and others among consumers and the professional nutrition community):

1. Concepts on the label are complex, and likely to be unfamiliar and not well understood by many consumers. Terms such as riboflavin, thiamine, niacin, Percentage of U.S. Recommended Daily Allowances (U.S. RDA) are examples of information that may not be understood by the average consumer.

Nutrition Information Per Serving	
Serving Size	¼ Pizza
Servings per Container	4
Calories	240
Protein	9g
Carbohydrate	35g
Fat	7g
Percentage of U.S. Recommended Daily Allowances (U.S. RDA)	
Protein	20%
Vitamin A	15%
Vitamin C	8%
Riboflavin	10%
Thiamine	8%
Niacin	10%
Calcium	10%
Iron	6%

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2. Use of different methods of quantification that appear simultaneously on the label makes a comparison of nutrients on the label difficult. Such methods of quantification include:

   a. Household measures (1/4 pizza, 4 ounces, 2 tablespoons, etc.) for serving size
   b. Calories in absolute terms
   c. Grams for the macro-nutrients
   d. Percentages for protein and the micro-nutrients

Nutrition Information Per Serving		
Serving Size	¼ Pizza	a.
Servings Per Container	4	
Calories	240	b.
Protein	9g	
Carbohydrate	35g	c.
Fat	7g	
Percentage of U.S. Recommended Daily Allowances (U.S. RDA)		
Protein	20%	
Vitamin A	15%	d.
Vitamin C	8%	
Riboflavin	10%	
Thiamine	8%	
Niacin	10%	
Calcium	10%	
Iron	6%	

3. The quantity of information presented on the label may overload the capacity of many consumers to comprehend, absorb and use as a basis for making nutrition-related decisions.

4. From a communication viewpoint, the organization of information is less than optimal in that:

   a. It is not grouped by types of information
   b. It is not presented in a sequence of public health concern
   c. It does not emphasize information of high public health concern

Nutrition Information Per Serving	
Serving Size	¼ Pizza
Servings Per Container	4
Calories	240
Protein	9g
Carbohydrate	35g
Fat	7g
Percentage of U.S. Recommended Daily Allowances (U.S. RDA)	
Protein	20%
Vitamin A	15%
Vitamin C	8%
Riboflavin	10%
Thiamine	8%
Niacin	10%
Calcium	10%
Iron	6%

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C. Addressing the above issues, we recommend the following changes to the existing label format be considered:

1. Combine the two terms: "Nutrition Information Per Serving" and "Serving Size": 1/4 Pizza" to: "Nutrients per 1/4 pizza."

Nutrition Information Per Serving	
Serving Size	¼ Pizza
Servings Per Container	4
Calories	240
Protein	9g
Carbohydrate	35g
Fat	7g
Percentage of U.S. Recommended Daily Allowances (U.S. RDA)	
Protein	20%
Vitamin A	15%
Vitamin C	8%
Riboflavin	10%
Thiamine	8%
Niacin	10%
Calcium	10%
Iron	6%

Nutrients Per ¼ Pizza	
Servings Per Container	4
Calories	240
Protein	9g
Carbohydrate	35g
Fat	7g
Percentage of U.S. Recommended Daily Allowances (U.S. RDA)	
Protein	20%
Vitamin A	15%
Vitamin C	8%
Riboflavin	10%
Thiamine	8%
Niacin	10%
Calcium	10%
Iron	6%

2. Eliminate the requirement that "Servings Per Container: 4" be stated on the nutrition panel.

Nutrients Per ¼ Pizza	
Servings Per Container	4
Calories	240
Protein	9g
Carbohydrate	35g
Fat	7g
Percentage of U.S. Recommended Daily Allowances (U.S. RDA)	
Protein	20%
Vitamin A	15%
Vitamin C	8%
Riboflavin	10%
Thiamine	8%
Niacin	10%
Calcium	10%
Iron	6%

Nutrients Per ¼ Pizza	
Calories	240
Protein	9g
Carbohydrate	35g
Fat	7g
Percentage of U.S. Recommended Daily Allowances (U.S. RDA)	
Protein	20%
Vitamin A	15%
Vitamin C	8%
Riboflavin	10%
Thiamine	8%
Niacin	10%
Calcium	10%
Iron	6%

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3. List protein only once on the label (for example, in grams with the other macro-nutrients) instead of twice.

Nutrients Per ¼ Pizza	
Calories	240
Protein	9g
Carbohydrate	35g
Fat	7g
Percentage of U.S. Recommended Daily Allowances (U.S. RDA)	
Protein	20%
Vitamin A	15%
Vitamin C	8%
Riboflavin	10%
Thiamine	8%
Niacin	10%
Calcium	10%
Iron	6%

Nutrients Per ¼ Pizza	
Calories	240
Protein	9g
Carbohydrate	35g
Fat	7g
Percentage of U.S. Recommended Daily Allowances (U.S. RDA)	
Vitamin A	15%
Vitamin C	8%
Riboflavin	10%
Thiamine	8%
Niacin	10%
Calcium	10%
Iron	6%

4. Reduce the term: "Percentage of U.S. Recommended Daily Allowances (U.S. RDA)" to: "Percent of Daily Allowance."

Nutrients Per ¼ Pizza	
Calories	240
Protein	9g
Carbohydrate	35g
Fat	7g
Percentage of U.S. Recommended Daily Allowances (U.S. RDA)	
Vitamin A	15%
Vitamin C	8%
Riboflavin	10%
Thiamine	8%
Niacin	10%
Calcium	10%
Iron	6%

Nutrients Per ¼ Pizza	
Calories	240
Protein	9g
Carbohydrate	35g
Fat	7g
Percent of Daily Allowance	
Vitamin A	15%
Vitamin C	8%
Riboflavin	10%
Thiamine	8%
Niacin	10%
Calcium	10%
Iron	6%

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5. Make optional some of the micro-nutrients that are now mandatory on the label. (For example, riboflavin, thiamine and niacin, and those present at less than 2% of the U.S. RDA).

Nutrients Per ¼ Pizza	
Calories	240
Protein	9g
Carbohydrate	35g
Fat	7g
Percent of Daily Allowance	
Vitamin A	15%
Vitamin C	8%
Riboflavin	10%
Thiamine	8%
Niacin	10%
Calcium	10%
Iron	6%

Nutrients Per ¼ Pizza	
Calories	240
Protein	9g
Carbohydrate	35g
Fat	7g
Percent of Daily Allowance	
Vitamin A	15%
Vitamin C	8%
Calcium	10%
Iron	6%

6. Add information of public health concern to the label, such as the sodium content of the food.*

Nutrients Per ¼ Pizza	
Calories	240
Protein	9g
Carbohydrate	35g
Fat	7g
Percent of Daily Allowance	
Vitamin A	15%
Vitamin C	8%
Calcium	10%
Iron	6%

Nutrients Per ¼ Pizza	
Calories	240
Protein	9g
Carbohydrate	35g
Fat	7g
Sodium	640mg
Percent of Daily Allowance	
Vitamin A	15%
Vitamin C	8%
Calcium	10%
Iron	6%

* FDA published a proposal in the Federal Register on June 18, 1982, Vol. 47, No. 118, which would require sodium be listed immediately below fat.

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7. Rearrange some of the information. For example, calories and fat at the top of the label. Previous FDA research indicates these should be given priority.

Nutrients Per ¼ Pizza	
Calories	240
Protein	9g
Carbohydrate	35g
Fat	7g
Sodium	640mg
Percent of Daily Allowance	
Vitamin A	15%
Vitamin C	8%
Calcium	10%
Iron	6%

Nutrients Per ¼ Pizza	
Calories	240
Fat	7g
Protein	9g
Carbohydrate	35g
Sodium	640mg
Percent of Daily Allowance	
Vitamin A	15%
Vitamin C	8%
Calcium	10%
Iron	6%

8. Group information by category to make individual nutrients easier to find.

Nutrients Per ¼ Pizza	
Calories	240
Fat	7g
Protein	9g
Carbohydrate	35g
Sodium	640mg
Percent of Daily Allowance	
Vitamin A	15%
Vitamin C	8%
Calcium	10%
Iron	6%

Nutrients Per ¼ Pizza	
Calories	240
Fat	7g
Protein	9g
Carbohydrate	35g
Sodium	640mg
Percent of Daily Allowance	
Vitamin A	15%
Vitamin C	8%
Calcium	10%
Iron	6%

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9. Encourage but not require the emphasis of high priority items such as calories.

Nutrients Per ¼ Pizza	
Calories	240
Fat	7g
Protein	9g
Carbohydrate	35g
Sodium	640mg
Percent of Daily Allowance	
Vitamin A	15%
Vitamin C	8%
Calcium	10%
Iron	6%

Nutrients Per ¼ Pizza	
Calories	240
Fat	7g
Protein	9g
Carbohydrate	35g
Sodium	640mg
Percent of Daily Allowance	
Vitamin A	15%
Vitamin C	8%
Calcium	10%
Iron	6%

D. To summarize the above recommendations we have considered:

1. Simplifying and eliminating information.
2. Reorganizing and grouping information.
3. Emphasizing information of high public health concern

Nutrition Information Per Serving	
Serving Size	¼ Pizza
Servings per Container	4
Calories	240
Protein	9g
Carbohydrate	35g
Fat	7g
Percentage of U.S. Recommended Daily Allowances (U.S. RDA)	
Protein	20%
Vitamin A	15%
Vitamin C	8%
Riboflavin	10%
Thiamine	8%
Niacin	10%
Calcium	10%
Iron	6%

Nutrients Per ¼ Pizza	
Calories	240
Fat	7g
Protein	9g
Carbohydrate	35g
Sodium	640mg
Percent of Daily Allowance	
Vitamin A	15%
Vitamin C	8%
Calcium	10%
Iron	6%

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E. Up to this point we have only considered modifications to the existing label format. In order to develop other format designs, RPGA established a design matrix which outlines the various alternatives available for design explorations.

Design Alternatives	Basis of Calculation: A Per Serving	B Per Calories	C Per 100 Grams
1 Numerical	A1	B1	C1
2 Verbal	A2	B2	C2
3 Graphical	A3	B3	C3

1. Cells C1, C2, and C3 represent labels which present nutrition information on a 100 grams basis. Although this standard of measure is widely used in Europe and elsewhere, the metric system is not well understood by most American consumers. In addition, most consumers consider nutritional information presented on a serving basis to be more useful to them than when it is presented on the basis of a somewhat arbitrary unit of weight. For these reasons, we have not carried development of labels on a 100 grams basis beyond our initial explorations.

2. Cell A1 represents the existing label format. We have developed simplified and reorganized alternatives of it earlier in this presentation.

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3. Cell A2 represents a verbal presentation of the nutrition information quantified on a per serving basis. In order to present nutrients on a verbal or adjectival scale it would be first necessary to establish a verbal scale such as the following that corresponds to some agreed percent of daily allowance:

Verbal Scale

None or Trace
Fair
Good
Very Good
Excellent

A typical label for cheese pizza might be:

Nutrients Per ¼ Pizza	
Calories	**240**
Fat	7g
Protein	9g
Carbohydrate	35g
Sodium	640mg
Rating of Daily Allowance	Rating:
Vitamin A	Good
Vitamin C	Fair
Calcium	Fair
Iron	Fair

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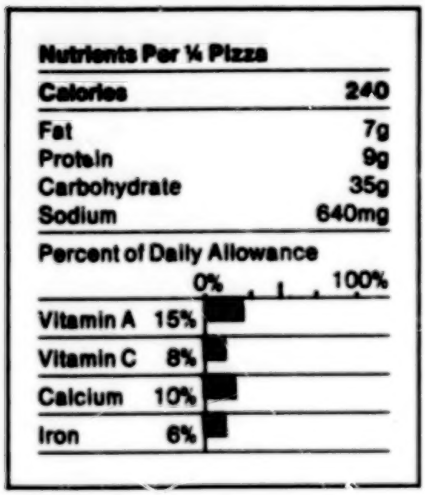
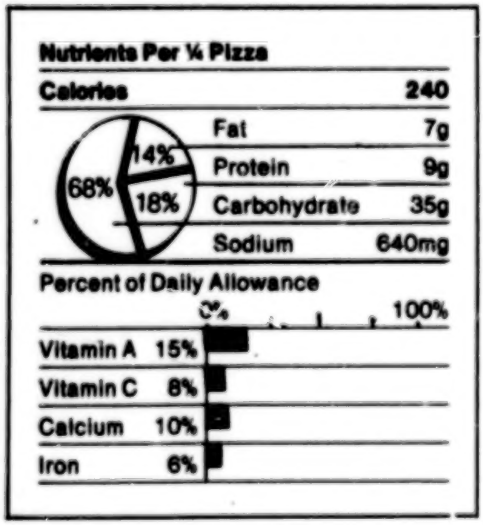
4. Cell A3 represents a graphic presentation of nutrition information quantified on a per serving basis. A typical label for cheese pizza might be:



However, the top and bottom of the label are presented in different formats, one numeric, the other graphic. To unify both elements, a graphic presentation of the total label might represent the macro-nutrients on dry weight basis on a pie chart.



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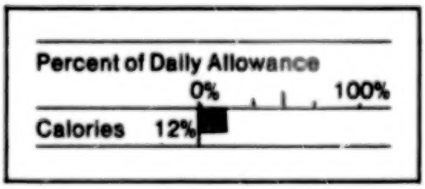
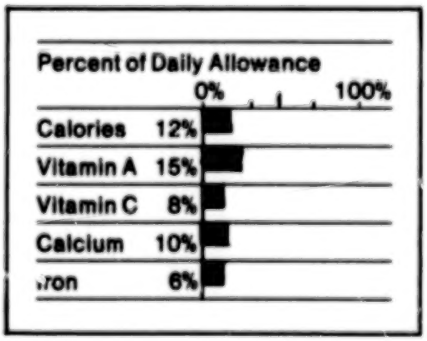
5. Cells B1 and B2 represent a numerical and verbal presentation of nutritional information quantified on a caloric content basis. When these two cells were developed, cell B2 was identical to cell A2 and cell B1 was identical in format to cell A1 with only the absolute quantities of the nutrients being different from those on cell A1. To avoid redundancy, we have not developed these cells further at this time, but have concentrated instead on the graphic format (cell B3) which holds much promise for presenting information in a clearer and more understandable way.

6. Cell B3 represents a graphic presentation of nutritional information quantified on a caloric content basis. Before label formats on a calorie basis could be developed, it was necessary to select a standard for daily consumption for calories. Accordingly, if a daily standard of 2,000 calories were selected for design purposes, then a 240 calorie serving of pizza could be shown as comprising 12% of daily allowance:



Presenting calories with the other nutrients for which a Daily Allowance has been established can be shown as:



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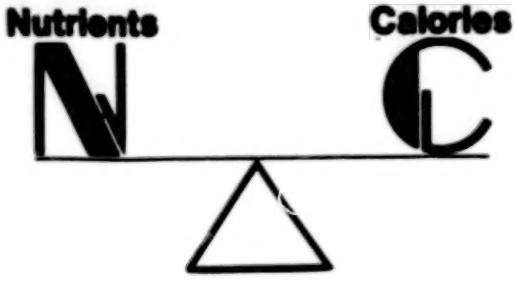
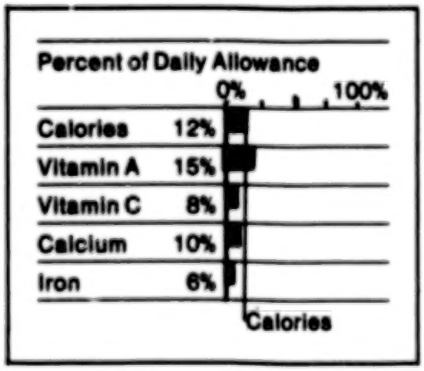
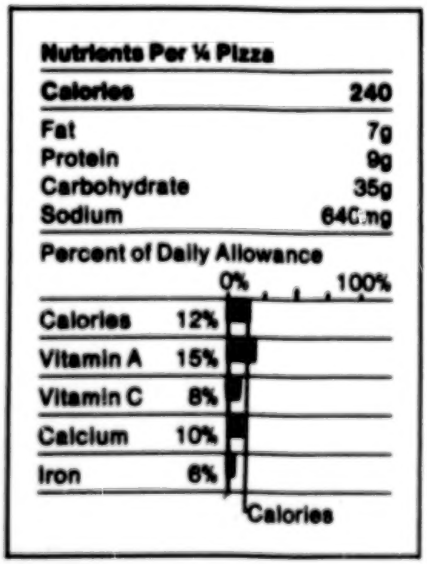
This, in turn, leads us to the concept of nutrient density: the concept of comparing a food's nutritional content to its calorie content.



This comparison has been previously proposed and extensively tested by Gaurth Hansen, Annette Dickenson and others and is deserving of our closest attention. To facilitate this comparison on the label, a "calorie line" can be graphically included. Thereby, the nutrient content of a 240 calorie serving of cheese pizza compared to its calorie content could be shown as:



The total label then might be shown as:



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To summarize, we have developed labels which presented information in the following five formats:

Nutrients Per ¼ Pizza	
Calories	**240**
Fat	7g
Protein	9g
Carbohydrate	35g
Sodium	640mg
Percent of Daily Allowance	
Vitamin A	15%
Vitamin C	8%
Calcium	10%
Iron	6%

Numerical macro-nutrients

+

Numerical micro-nutrients

Nutrients Per ¼ Pizza	
Calories	**240**
Fat	7g
Protein	9g
Carbohydrate	35g
Sodium	640mg
Rating of Daily Allowance	Rating:
Vitamin A	Good
Vitamin C	Fair
Calcium	Fair
Iron	Fair

Numerical macro-nutrients

+

Verbal micro-nutrients

Nutrients Per ¼ Pizza	
Calories	**240**
Fat	7g
Protein	9g
Carbohydrate	35g
Sodium	640mg
Percent of Daily Allowance	
	0% 100%
Vitamin A	15%
Vitamin C	8%
Calcium	10%
Iron	6%

Numerical macro-nutrients

+

Graphic micro-nutrients

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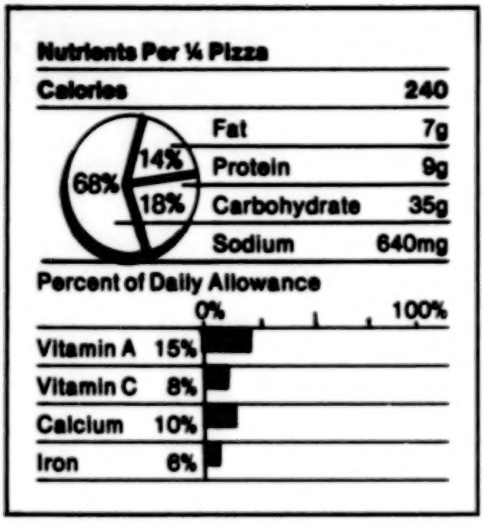
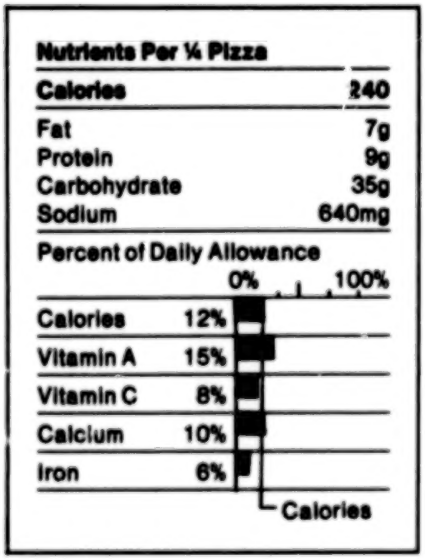


Graphic macro-nutrients

+

Graphic micro-nutrients



Numerical macro-nutrients

+

Graphic Nutrient Density
Micro-nutrients

In each of these variations, the top of the label and the bottom of the label are presented in dissimilar formats. We propose to eliminate this disparity and to simplify the label into what we call a "unitary" design.

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7. The Unitary Label

Before we can develop a truly unified label design, it is necessary to select daily standards for all of the nutrients on the label.

a. Standards for daily consumption (U.S. Recommended Daily Allowances (U.S. RDA) have already been established by the Food and Drug Administration for protein, vitamins and minerals.

b. We have previously suggested 2,000 as an example standard* for calories for design purposes.

c. For illustration purposes, standards for the remaining nutrients could be as follows:

Nutrient	Daily Standard*
Protein	13% of calories or 65g (U.S. RDA)
Fat	35% of calories or 78g (referenced as a guideline by the National Academy of Sciences) (NAS)
Carbohydrate	52% of calories or 260g (by subtraction)
Sodium	3,000 mg (within the Safe and Adequate Daily Intake established by NAS)

* We wish to make it completely clear that these specific standards are not endorsed or recommended by the FDA or USDA. They are selected only to illustrate what the format would look like if these or some similar standards were adopted.

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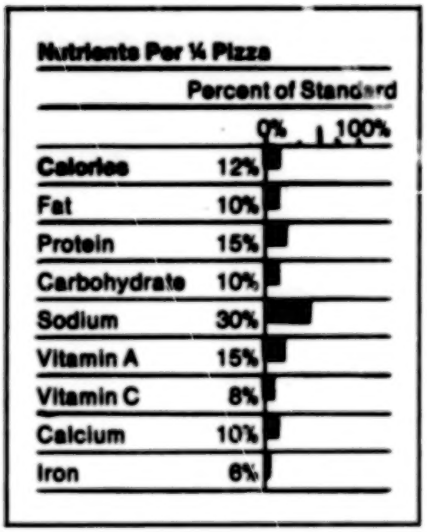
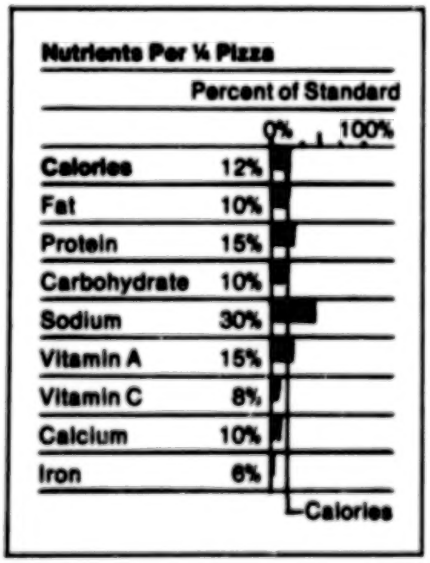
Using these suggested standards, a "unitary" label for a serving of cheese pizza could be shown as:



This format is easily adapted to the nutrient density concept by including a "calorie" line which facilitates the comparison of the nutrient content of the food to its caloric value. Certain difficulties are recognized in regard to nutrients where limitations on consumption are desired, thereby requiring education to the effect that larger bars/percentages are not always desirable.



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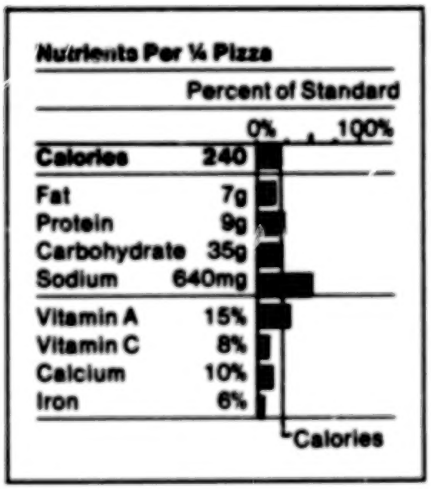
While we feel the "unitary" nutrient density format with only the percent of standard given for calories, sodium and macro-nutrients may be best from a communication point of view because of its simplicity, we feel consumers want to know the number of calories and the number of grams and milligrams of the other nutrients even though the inclusion of this information may tend to clutter the format a bit. The percent of standard is still given by the bar chart as shown below:



Simplified Graphical/Graphical
(Unitary Nutrient Density)

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A visual comparison can now be made between the five formats which are proposed for consumer research evaluation.

Nutrition Information Per Serving	
Serving Size	¼ Pizza
Servings per Container	4
Calories	240
Protein	9g
Carbohydrate	35g
Fat	7g
Percentage of U.S. Recommended Daily Allowances (U.S. RDA)	
Protein	20%
Vitamin A	15%
Vitamin C	8%
Riboflavin	10%
Thiamine	8%
Niacin	10%
Calcium	10%
Iron	6%

Present Format

Nutrients Per ¼ Pizza	
Calories	240
Fat	7g
Protein	9g
Carbohydrate	35g
Sodium	640mg
Percent of Daily Allowance	
Vitamin A	15%
Vitamin C	8%
Calcium	10%
Iron	6%

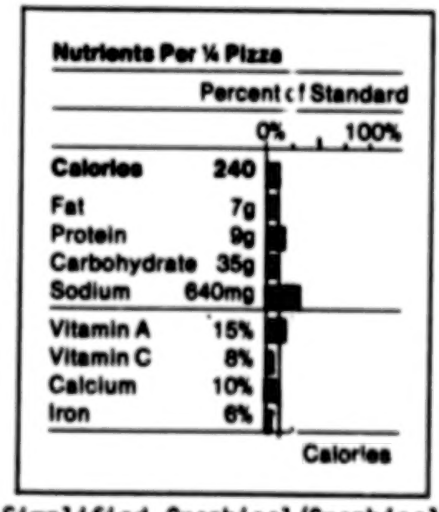
Simplified Numerical/Numerical

Nutrients Per ¼ Pizza	
Calories	240
Fat	7g
Protein	9g
Carbohydrate	35g
Sodium	640mg
Rating of Daily Allowance	Rating:
Vitamin A	Good
Vitamin C	Fair
Calcium	Fair
Iron	Fair

Simplified Numerical/Verbal

Nutrients Per ¼ Pizza		
Calories	240	
Fat	7g	
Protein	9g	
Carbohydrate	35g	
Sodium	640mg	
Percent of Daily Allowance		0% 100%
Vitamin A	15%	
Vitamin C	8%	
Calcium	10%	
Iron	6%	

Simplified Numerical/Graphica



Simplified Graphical/Graphical
(Unitary Nutrient Density)

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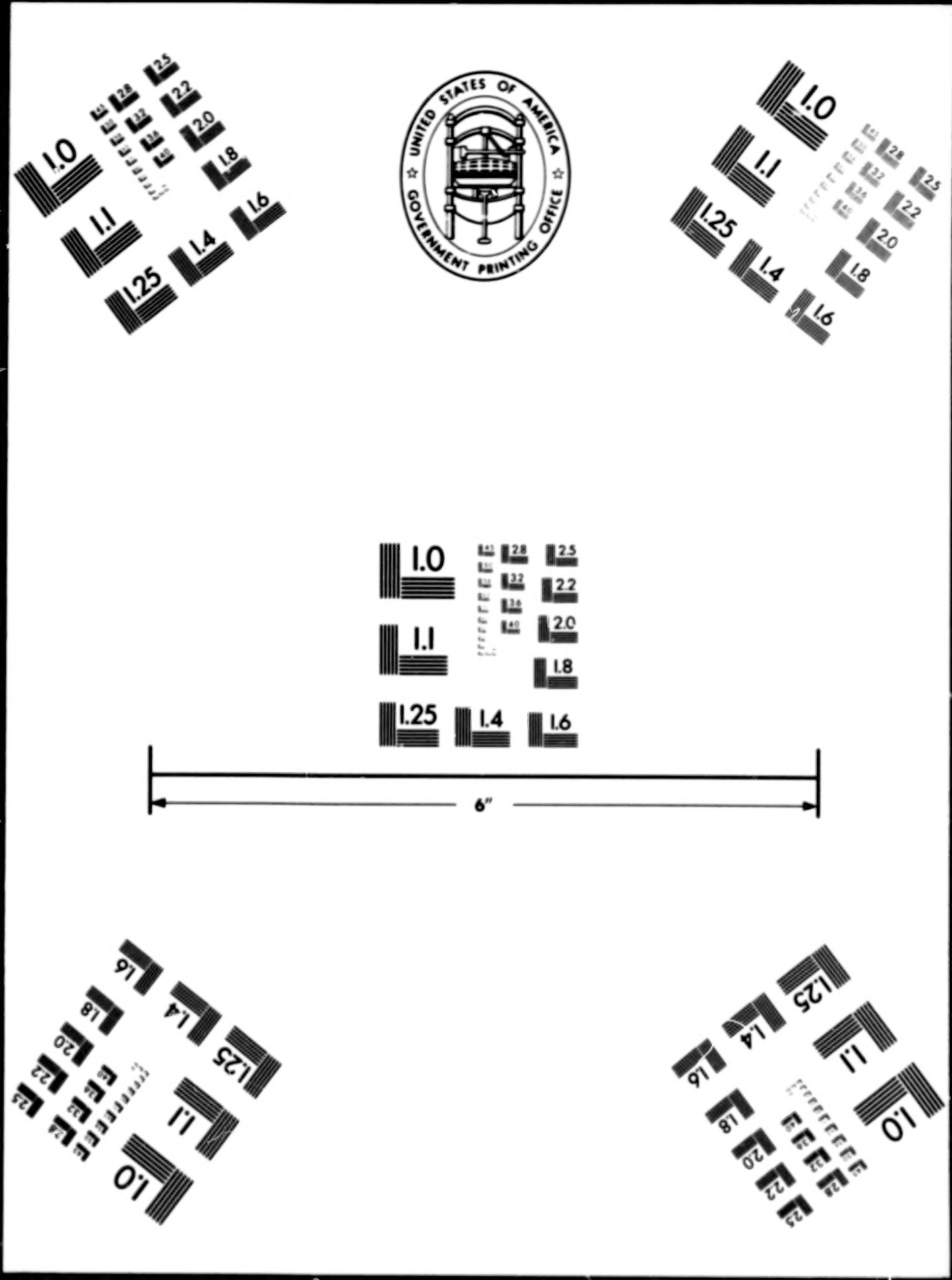
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